

CLAIMS

1. An apparatus for controlling voltage applied to an electrostatic precipitator comprising:

5 a pulsating, direct current, voltage device that is operable to receive power from an alternating current voltage source; and

a spiral wound filter capacitor, wherein the pulsating, direct current, voltage device is electrically connected to the spiral wound filter capacitor and the spiral wound filter capacitor is operable to be electrically connected to the electrostatic precipitator.

10 2. The apparatus according to Claim 1, wherein the spiral wound filter capacitor has a value of capacitance that is greater than .1 microfarad.

15 3. The apparatus according to Claim 1, wherein the spiral wound filter capacitor includes a core surrounded by at least one insulating layer and at least one conductive layer.

20 4. The apparatus according to Claim 3, wherein the core includes phenolic material, the at least one conductive layer includes a metallic film and the at least one insulating layer includes a dielectric film.

5. The apparatus according to Claim 1, wherein the pulsating, direct current, voltage mechanism includes a transformer, having a first input, a second input, a first output and a second output, wherein the first input of the transformer is electrically connected in series to a first inlet that is operable to receive an alternating current input voltage and the second input of the transformer is electrically connected in series to a second inlet that is operable to receive the alternating current input voltage and a full wave rectifier, having a first input, a second input, a first output and a second output, wherein the first input of the full wave rectifier is electrically connected to the first output of the transformer and the second input of the full wave rectifier is electrically connected to the second output of the transformer, wherein the spiral wound filter capacitor includes a first electrode and a second electrode, wherein the first electrode of the spiral wound filter capacitor is electrically connected to the first output of the full wave rectifier and the second electrode of the spiral wound filter capacitor is electrically connected to the second output of the full wave rectifier.

6. The apparatus according to Claim 5, wherein the pulsating, direct current voltage mechanism includes at least one voltage control mechanism, having an input and an output, wherein the input of the at least one voltage control mechanism is electrically connected to a first inlet that is operable to receive an alternating current, input voltage and further includes a current limiting reactor, having an input and an output, wherein the input of the current limiting reactor is electrically connected in series to the output of the voltage control mechanism, wherein the first input of the transformer is electrically connected in series to the output of the current limiting reactor and the second input of the transformer is electrically connected in series to a second inlet that is operable to receive the alternating current, input voltage.

7. The apparatus according to Claim 6, wherein the voltage control mechanism includes at least one silicon-controlled rectifier and an automatic voltage control device.

8. The apparatus according to Claim 1, wherein the spiral wound filter capacitor is electrically connected in series to a resistor, wherein the pulsating, direct current, voltage mechanism is electrically connected in parallel to a combination of the spiral wound filter capacitor and the resistor, wherein the combination of the spiral wound filter capacitor and the resistor is operable to be electrically connected in parallel to the electrostatic precipitator.

9. The apparatus according to Claim 8, wherein the resistor has a value of resistance that is less than 10,000 ohms.

10. An apparatus for controlling voltage applied to an electrostatic precipitator comprising:

a pulsating, direct current voltage mechanism that is operable to receive power from a single phase, alternating current voltage source; and

at least one combination of switching mechanism that is electrically connected in series with a spiral wound filter capacitor, wherein the at least one combination of switching mechanism and spiral wound filter capacitor is electrically connected in parallel to the pulsating, direct current voltage mechanism and the at least one combination of switching mechanism and spiral wound filter capacitor is operable to be electrically connected in parallel to the electrostatic precipitator.

11. A method for controlling voltage applied to an electrostatic precipitator, comprising:

reshaping a voltage waveform of the electrostatic precipitator, wherein spark current or attenuating normal corona currents are not decreased;

utilizing a direct current voltage device connected to a capacitive element; and

connecting said direct current voltage device and said capacitive element to said electrostatic precipitator, to provide the reshaping of said voltage waveform.

12. The method of claim 11, wherein said capacitive element is a spiral wound filter capacitor.

13. The method of claim 12, wherein said spiral wound filter capacitor has a
5 capacitance that is greater than .1 microfarad

14. A method for controlling voltage applied to an electrostatic precipitator comprising:

connecting between an alternating current power source and the electrostatic
10 precipitator, a pulsating direct current power source; and

connecting between said pulsating direct current power source and the
electrostatic precipitator, one or more electronic elements to reduce a ripple voltage and
provide a collection efficiency in the electrostatic precipitator, said reduced ripple
voltage occurring when the minimum, average and peak value voltage waveforms of the
15 electrostatic precipitators are approximately equal.

15. The method of claim 14, wherein said one or more electronic elements is a
spiral wound filter capacitor, said spiral wound filter capacitor electrically connected in
parallel between said pulsating direct current power source and the electrostatic
20 precipitator

16. The method of claim 14, wherein said one or more electronic elements is a
combined assembly of a spiral wound filter capacitor electrically connected in series to a
resistor.

17. The method of claim 16 wherein one or more said combined assembly are
electrically connected between said pulsating direct current power source and the
electrostatic precipitator.

18. The method of claim 17 wherein said one or more combined assembly are electrically connected with said pulsating direct current power source and the electrostatic precipitator, in parallel.

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